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AUTHOR Miller, Margery Silberman
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ABSTRACT

The paper provides a theoretical framework for the inclusion of a verbal intelligence test as part of the psychodiagnostic assessment battery used with deaf children. Descriptions are provided for three selected sign language varieties being used in a study designed to examine performance of 30 deaf children (9-16 years old) on signed administrations of the verbal subtests of the Weschler Intelligence Scale for Children--Revised (WISC-R). The three sign language varieties are illustrated by comparing selected verbal subtest items presented in signed English (sE), Pidgin Sign English-English (PSE-E), and Pidgin Sign English-American Sign Language (PSE-A). Preliminary results are reported, and the importance of cautious interpretation of verbal IQ scores for deaf children is stressed. It is suggested that the verbal scale of the WISC-R not be administered to deaf children under 9 years old. (Author/CL)

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EXPERIMENTAL USE OF SIGNED PRESENTATIONS OF THE VERBAL SCALE OF THE WISC-R WITH PROFOUNDLY DEAF CHILDREN: A PRELIMINARY REPORT OF THE SIGN SELECTION PROCESS AND EXPERIMENTAL TEST PROCEDURES

Margery Silberman Miller
Maryland School for the Deaf at Frederick

Abstract

This paper provides a theoretical framework for the inclusion of a verbal intelligence test as part of the psychodiagnostic assessment battery used with deaf children. Descriptions are provided for three selected sign language varieties being used in a study designed to examine deaf children's performance on signed administrations of the verbal subtests of the Wechsler Intelligence Scale for Children--Revised (WISC-R). The three sign language varieties are illustrated by comparing selected verbal subtest items presented in signed English (sE), Pidgin Sign English-English (PSE-E), and Pidgin Sign English-American Sign Language (PSE-A). Preliminary results are reported.

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Background

Tests of English language competence which are normed on the linguistically dominant hearing culture have traditionally been used to measure the verbal skills of deaf people in the United States. These test results have generally shown linguistic inferiority in deaf individuals (Pinter & Paterson, 1916a, 1916b; Pugh, 1946; Myklebust, 1960; Goda, 1964; Brannon, 1968) and have been used to support the view that although deaf individuals perform similarly to hearing individuals on nonverbal tasks, they are deficient in acquiring mastery of English syntax and morphology in writing, reading, and "through the air" communication (Heider & Heider, 1940; Simmons, 1962; Knight, 1979; Quigley & Power, 1972). Deaf individuals have also demonstrated deficiencies in academic verbal tasks, as evidenced by lower scores and slower achievement gains, when compared with hearing subjects, on verbal components of the Stanford Achievement Test (Jensema, 1975).

Recently, several language tests have been administered in signed English to deaf children (Bentler, Elfenbein & Schum, 1982). The incorporation of manually presented test items is an improvement over traditional assessment procedures because the child's reading and writing abilities do not influence test performance. Although these tests are valid in that they examine a deaf student's competence in acquiring standard English in a manually coded form, they should not be accepted as measures of the student's overall ability to function linguistically. That is, signed English is not necessarily the form of sign language that is habitually used by the student.

The acquisition of standard English remains an obviously vital objective of deaf education. The results of standard English language assessments are useful in locating the deaf student's level of English language acquisition as well as pinpointing specific teaching objectives in this area. While these assessments are basic to individual educational planning, they do not provide an index of a

deaf person's competence in acquiring the language of his own culture. Furthermore, these tests are unable to analyze deaf individuals' hierarchical use of their language to receive and transmit verbal concepts, which are the abilities that foster the development of progressively higher forms of verbal thought and verbal-cognitive abstractions.

One of the traditional methods of assessing the verbal thought processes of hearing children has been through the administration of the verbal scale of standardized tests of intelligence, such as the Wechsler Intelligence Scale for Children--Revised (WISC-R). It is standard psychological testing practice, however, not to administer these verbal intelligence tests to deaf students. This practice is partly due to the field's present level of sophistication concerning the linguistic delays and/or differences of the deaf population (Quigley & Power, 1972; Quigley, Wilbur, Power, Montanelli & Steinkamp, 1976; Bonvillian, Nelson & Charrow, 1976) and the concern that these language delays will adversely effect scores on verbal tests of intelligence.

Low scores on oral presentations of verbal tests of intelligence have been used to label many deaf people as mentally retarded (Vernon, 1968) and have fostered the notion of the deaf population's intellectual inferiority. While Vernon (1967) and Vernon and Brown (1964) have reported results of many studies which demonstrate normal intelligence in deaf people as measured nonverbally, the use of verbal measures of intelligence is discouraged. Prior to the 1970's there was a predominance of oral education in America (Moores, 1978) and thus tests of verbal intelligence were only administered orally. It was appropriate at that time, considering the oral educational environment, to strongly discourage the use of verbal measures of intelligence because many deaf students did not comprehend what was being asked of them. However, with the educational climate presently favoring the incorporation of signs into deaf children's communication system, it

may no longer be necessary to rely solely upon nonverbal tasks to measure the intelligence of deaf individuals.

Another possible reason for the total reliance upon nonverbal IQ tests to examine the cognitive processes of deaf students is the popularity of the primary cognitive theory that views cognitive development as the limiting or enabling factor in the development of language and minimizes the influence that language has on cognition. Piaget is most commonly asscciated with this view, although Piaget and his supporters do acknowledge the strong influence of language upon certain areas of intellectual growth, especially for higher abstract levels of thought (Piaget, 1964; Furth & Youniss, 1971). Piaget argues, however, that it is the movement from one developmental stage to another that allows new semantic and syntactic features to develop. That is, cognitive development must precede linguistic development as children are incapable of communicating linguistically in ways in which they cannot think.

In contrast, the primary linguistic theory or linguistic determinism (Whorf, 1956) states that attainment of a certain level of language skill enables the child to advance to a new cognitive stage of development (Bruner, 1964). Linguistic determinism views language as the enabling force for the achievement of accurate perceptions of one's environment. The growth and development of concepts is seen as being primarily dependent upon language acquisition (De Laguna, 1927; Langer, 1942; Sapir, 1921; Church, 1961; Terwilliger, 1968). According to Church (1961), new language skills allow for new and different kinds of reality, and language (the child's own language and that of others) enables him to perceive his environment and organize the incoming stimuli. Abstracted from Church's (1961) work, the following principles of development serve as descriptive statements of the primary linguistic theory:

(1) Language enables us to deal abstractly with things, people, and events without handling or experiencing them.

(2) Although perceptual thinking and certain non-symbolic forms of nonperceptual thinking may take place without verbalization, normal language acquisition is a necessary but not sufficient prerequisite for the development of mature, normal thought processes.

(3) Failure to develop adequate language skills results in egocentric thought patterns where a person is immersed in his own point of view as contrasted with the more advanced state of human development referred to as relativism.

(4) Relativism enables a person to mentally place himself in another's place and to view the world as seen through the eyes of another. Language acquisition facilitates the movement from egocentrism to relativism.

(5) Church defines intelligence as "...the ability to operate effectively with symbols" (Church, 1961, p. 164).

Language has been defined as "...knowledge of a code for representing ideas about the world through a conventional system of arbitrary signals for communication" (Bloom & Lahey, 1978, p. 23), and sign language has been shown to meet the language requisites (Bellugi & Klima, 1975; Friedman, 1977; Wilbur, 1976). Substituting the terms sign language and signed utterances for Church's terms of language and verbalizations, respectively, we can adopt his linguistic-cognitive model to conceptualize the relationship between sign language and intelligence and its theoretical relevance to the assessment of deaf children (Miller, 1983).

As previously stated, most psychometric tests used with deaf children tap nonverbal intelligence. Nonverbal intelligence, however, is only one component of the complicated and multidimensional nature of cognition. If one adopts a narrowly focused approach to intelligence, then any task that requires thought can

be viewed as a measurement of intelligence. However, experts are re-examining the nature of thought processes and many are viewing intelligence as multifaceted, with a multitude of different tasks needed to measure different kinds of mental activity (Johnston, 1982).

While cognitive psychologists acknowledge the strong relationship between language and thought, they still differ on the definition of that relationship. These differences aside, considering the close relationship between language and thought, and viewing intelligence as multifaceted, verbal as well as nonverbal measurements of intelligence need to be included in the overall psycho-educational assessment of deaf children. The facility with which this inclusion can be accomplished depends upon providing a means of mediating between factors of test-taking and test performance. Because a majority of profoundly deaf students are consistently exposed to a system of signs (Jordan, Gustason & Rosen, 1979), it appears appropriate to re-examine the use of verbal intelligence tests with deaf students if these measures can be administered in their preferred mode of communication. Use of the verbal scales of intelligence tests with deaf students, administered in their own language system, would provide useful information regarding their ability to use symbols to comprehend and transmit verbal concepts.

While changing verbal subtest items of intelligence tests into sign language appears to be a simple task, there is little agreement about what sign system or sign variety best represents the language of deaf children. Many people view American Sign Language (ASL) as the native or natural language of the deaf. ASL may be the preferred communication system for the majority of deaf adults; however, with more than 90% of deaf children in the United States being born to hearing parents (Rawlings & Jensema, 1977) it is difficult to accept the assumption that ASL is the first or natural language of the deaf children except for those children whose deaf parents use ASL (Quigley & Kretschmer, 1982). It is not

possible to provide only one accurate description of which sign system most young deaf children are exposed to because of the varied communication systems used in preschool and early elementary programs, and the varied communication patterns in the homes of deaf children.

Therefore, before undertaking a study to examine the verbal intelligence of deaf children, it is necessary to determine the process by which the sign language varieties will be selected for use in translating the verbal subtest items. A brief description of the major sign systems used in educational settings in the United States should serve to establish the parameters of the problem. There are three major sign language (visual/spatial/manual) categories being used in the United States that span a varietal continuum from English to American Sign Language (ASL) (Friedman, 1977; Fant, 1972; Stokoe, 1970; Fischer, 1978). There are no definite parameters to clearly define the movement from one variety of sign language to another (Friedman, 1977). At one end of the continuum are the manual/visual codes for representing English which incorporate a "...morpheme-to-morpheme representation of English" (Friedman, 1977, p. 3). These manually coded English systems were once prolific and included such systems as Linguistics of Visual English (Wampler, 1972) and Seeing Essential English (Anthony, 1971). The major signed English systems presently being used are Signed English (Bornstein, Hamilton, Saulnier & Roy, 1975) and Signing Exact English (Gustason, Pfetzing & Zawolkow, 1972; 1975).

American Sign Language (ASL) is at the other end of the continuum. It is a visual/spatial/gestural system used by more than a half million deaf people in the United States (Friedman, 1977). ASL has its own syntactic construction and semantic devices, and has in recent years been accorded full language status (Friedman, 1977; Wilbur, 1976; Bellugi & Fischer, 1972; Bellugi & Klima, 1975; Bellugi, Klima & Siple, 1974; Hoemann, 1976).

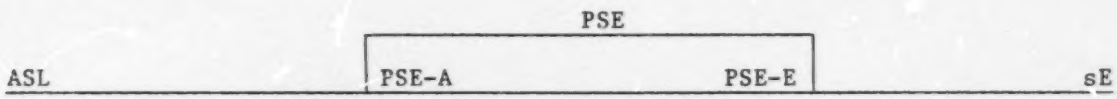
At the center of the continuum is Pidgin Sign English (PSE) which is a variety of sign language that generally follows English word order while using many ASL signs (Woodward, 1973; Woodward & Markowicz, 1975). It is referred to as a pidgin because it theoretically does not represent anyone's first language but is a variation of both ASL and English. PSE serves as the communicative link between hearing and deaf communicators (Woodward, 1973; Woodward & Markowicz, 1975).

The term Pidgin Sign English (PSE) does not represent one standardized system of signs. It, too, can be viewed according to a continuum model. Some forms of PSE follow English word order very closely while other forms incorporate many aspects of ASL grammar, such as sign space, directionality, and pluralization (Quigley & Kretschmer, 1982). Although there is no clear demarcation between the two variations of PSE, boundaries can be loosely defined according to which language structures, English or ASL, predominate the signed utterances. This author will designate the PSE variety that follows English word order, with most function words and signed English word endings deleted, as Pidgin Sign English-English (PSE-E). The term Pidgin Sign English-American Sign Language (PSE-A) will be used to refer to the PSE variety that usually follows ASL word order and incorporates more of the nonmanual features of ASL than found in the PSE-E variety.

Using the sign language continuum, ranging from signed English to ASL, the process of selecting sign language varieties to be used in translating verbal subtest items of standardized tests of intelligence can begin. The Verbal Scale of the Wechsler Intelligence Scale for Children--Revised (WISC-R) has been selected for use in the study (to be described later) because of the widespread use of the WISC-R as a valid and reliable test of general intelligence, its wide age range from 6-16 years, and the provision of test age scores so that an interpretation of scores can be made form a developmental viewpoint (Compton, 1980).

Additionally, the Performance Scale of the WISC-R appears to be the most frequently used test to assess the nonverbal mental abilities of deaf children (Levine, 1971; Sullivan, 1982). For the purpose of determining a sign selection procedure for item presentation of the verbal subtests of the WISC-R, we shall adopt Fischer's view that ASL and signed English and all PSE varieties between them should be considered as legitimate languages of the deaf (Fischer, 1978).

The visual representation of the sign language continuum below depicts the various sign language varieties.



Study

Most deaf children can function somewhere along the ASL-signed English continuum, using some form of Pidgin Sign English. Therefore, both of the PSE varieties, PSE-A and PSE-E, are being included in a study being conducted by the author to examine the verbal intelligence of non-multiply handicapped, profoundly deaf children between the ages of 9 and 16 years. It is important to note that the majority of test items in the PSE-A variety are "pure" ASL translations. The sign system is called PSE-A instead of ASL because some of the test items, when presented in "pure" ASL, provide strong cues that could easily lead the children to the correct responses or actually provide the responses in the question. Additionally, many of the words on the test are fingerspelled to preserve the intended levels of verbal difficulty as the test items are hierarchically ordered. Because many of the fingerspelled words have accepted signs that are regularly used in ASL, some of the test items cannot be considered as being "pure" ASL translations, and are therefore referred to as PSE-A translations.

WISC-R verbal subtest item translations have been developed in three sign language varieties: sE, PSE-E, and PSE-A. Sign language translations were decided upon by the author and two deaf adults. The deaf adults were both professional educators of the deaf, both from deaf families, and both familiar with sign language varieties. Test items are also available in print, in standard English. Inclusion of a written stimulus of the test items is based upon information received from an analysis of Stanford Achievement Test results with deaf students. The children received higher scores on reading comprehension than on signed presentations of the Communication Comprehension subtest (Trybus, 1978). These results may indicate that even with the low reading abilities of many deaf children, printed presentations may be more effective for transmitting complex material than signed presentations (Trybus, 1978).

A description of the study which utilizes the translated verbal subtest items in sE, PSE-E, and PSE-A will now be presented. The purpose of the study is to examine the verbal intelligence of non-multiply handicapped, profoundly deaf children and adolescents, as measured by obtained scores on the Verbal Scale of the WISC-R.

Subjects

There were 30 subjects, 14 females and 16 males, included in the study. All subjects were between the ages of 9 and 16 years. Subject selection criteria included: age of onset of deafness at or before 24 months; hearing thresholds of 90 dB (PTA) or greater in the better ear; consistent use of sign language in an academic setting by the time the child was 6 years of age; absence of additional handicapping conditions, such as cerebral palsy, epilepsy, severe emotional disturbance, mental retardation, Usher's Syndrome, or visual-perceptual disorders; and a WISC-R Performance IQ score of 80 or better.

Procedures

Each subject in the study is randomly assigned to one of three experimental groups. One of the three selected sign systems (i.e., signed English, Pidgin Sign English-English, and Pidgin Sign English-American Sign Language) was selected as the first presentation mode, with the remaining two modes used as "back-up" modes if the answer to a test item was initially incorrect. For example, one-third of the subjects were asked each question in PSE-E. If the subject answered correctly, the examiner presented the next test item, also in PSE-E. If the answer was incorrect, however, the same test item was presented in sE. If the item was failed again, the final sign presentation was made in PSE-A. If the response was still incorrect, the printed version of the test item was presented. The order of the second and third sign system presentation mode was counterbalanced in each of the three experimental groups. Figure 1 illustrates the sign system progression for each of the three experimental groups.

Figure 1

Order of Sign System Presentation for the Three Experimental Groups

Group #1	Group #2	Group #3
1. PSE-A	1. PSE-E	1. sE
2. sE	2. sE	2. PSE-E
3. PSE-E	3. PSE-A	3. PSE-A
or	or	or
1. PSE-A	1. PSE-E	1. sE
2. PSE-E	2. PSE-A	2. PSE-A
3. sE	3. sE	3. PSE-E

All test items from the Verbal Scale of the WISC-R were presented to all subjects. Discontinue rules were intentionally ignored so that a preliminary

determination could be made regarding the similarities or differences between the hierarchical progression of verbal concept acquisition for deaf and hearing subjects. Discontinue rules for deaf subjects were determined on the same basis as that used by Kaufman during the standardization of the WISC-R (A. S. Kaufman, personal communication, June 1, 1983).

The WISC-R verbal subtest items presented in Table 1 serve as an illustration of the selected sign language varieties. Underlining a word indicates that the word must be fingerspelled and not signed. Parentheses are used to remind the examiner to use the ASL sign rather than a newer sign which often uses the letter shape of the first letter of the word in the sign's hand configuration, commonly referred to as initialized signs.

Table 1

Sign Language Variations of Selected Verbal Subtest Items from the WISC-R

Information Subtest	
Item No. 10	
sE	How many things make a dozen?
PSE-E	(how many) - equal - (1) - dozen
PSE-A	(1) - dozen - equal - (how many)
Comprehension Subtest	
Item No. 10	
sE	Why do we have to put stamps on letters?
PSE-E	Why - (we) - must - put - stamp - on - (letter) - (show shape of envelope)
PSE-A	(letter) - (show shape of envelope) - stamp - must - (1 second pause) - why

Note: From the WISC-R manual by David Wechsler. Copyright 1974 by The Psychological Corporation. Reprinted and adapted by permission.

Results

The testing phase of this study was recently completed and the preliminary findings were very encouraging. The mean Verbal IQ score obtained by this sample, when calculated with four subtest scores (Information, Similarities, Arithmetic, and Comprehension), was 97.8. The mean Verbal IQ score obtained by the sample, calculated with five subtest scores (Information, Similarities, Arithmetic, Comprehension, and Digit Span), was 96.43. It should be noted that the Vocabulary subtest scores are not reflected in the Verbal IQ scores. The decision not to include these scores was made because many of the Vocabulary items were fingerspelled instead of signed in order to preserve the level of verbal sophistication of higher test items intended by the test's author. Thus, this subtest became a reading measure for deaf students as much as it is a vocabulary measure.

Discussion

The data are presently being analyzed to provide further information about deaf children's performance on the Verbal Scale of the WISC-R. A complete description of this study will be made available in the near future in a paper entitled, Administration of Signed Presentations of the Verbal Scale of the WISC-R to Non-Multiply Handicapped, Profoundly Deaf Children Aged 9-16 Years. Following completion of this study, the author will begin work on a full standardization of the testing procedure for signed administrations of the verbal subtests of the WISC-R for deaf children.

Every test of maximum performance, such as an IQ test or an achievement test, is a reflection of a combination of innate ability, acquired ability (life experiences such as education, training, home environment), and motivation (Lyman, 1963). IQ test scores are no longer perceived as being static, especially when used with very young children, or as representing intellectual potential. Al-

though IQ tests are limited in scope, and scores from these tests may be misinterpreted or misused by unsophisticated examiners, they remain the best measurement of an individual's mental functioning presently available, and good predictors, at least for hearing children, of future school achievement (Kaufman, 1979). Kaufman, a leader in the field of psychological testing, suggests a guarded approach toward the interpretation of the WISC-R scores. Kaufman recognizes the limited samples of behavior which are tapped by IQ tests and views these tests as measurements of what the child has learned up to the time of testing and not what a child is capable of learning. When viewed in this way, poor performance on an IQ test does not represent the child's limit, but rather indicates the need for facilitation of further growth through the educational environment (Kaufman, 1979, p. 11).

When interpreting Verbal Scale IQ scores of deaf children, even more caution must be exercised, and full explanations and interpretations of scores must be provided. The age-at-onset of the hearing loss, the degree of hearing impairment, the age at which communication and educational training were started, the type of preschool education received, the nature of family involvement in the communicative and educational processes, descriptions of additional handicapping conditions, and the child's use of and ability to benefit from amplification are but a few of the important factors to consider when interpreting Verbal Scale IQ scores of deaf children. As recommended for bilingual children, such as Spanish speaking students in the American education system (Kaufman, 1979), Full Scale IQ scores should not be computed nor included in the psycho-educational diagnostic reports of deaf children. The possibility of lower verbal scores significantly pulling down the higher performance scores could cause some people to interpret the Full Scale IQ as a valid representation of the child's global mental abilities. When deaf children are tested by means of verbal tests designed for use with hearing

children, examiners must exercise even more caution in interpreting test results that is regularly applied to interpretations of IQ scores of hearing children. Guarded interpretation is urged because of the lack of definitive statements that can be made, based upon existing research, concerning the causes of any depressed scores which deaf children may receive on the verbal subtests of the WISC-R. It may be that the educational system for deaf children is presently not able to meet all of the students' cognitive-linguistic needs or that the tests designed to measure the verbal intelligence of hearing children may not be sensitive to measuring the verbal-cognitive growth that occurs in deaf children who are using a manual system of communication.

Based upon the findings of research studies which question the reliability of scores from the performance scale of the WISC-R for young deaf children (Vernon & Brown, 1964; Meadow, 1975), it is suggested that the Verbal Scale of the WISC-R not be administered to deaf children under the age of nine years.

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Inquiries concerning this project may be directed to Margery S. Miller, Intermediate Department, Maryland School for the Deaf, 101 Clarke Place, P.O. Box 250, Frederick, MD 21701.

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